diſtinguiſhes it from all the other ſubordinate parts, that are only added to enrich the harmony, is, that if retrenched, the piece will be mutilated. Thoſe who perform the ripieno parts, may ſtop whenever they pleaſe, and the piece nevertheleſs will go on; but the performer to whom an obligato part is aſſigned, cannot ſtop a moment without being miſſed.

OBLIGEE, in *Law*, is the party to whom an obligation, or bond is made.

OBLIGOR, the party who enters into or executes an obligation, or bond.

OBLIQUATION, in *Catoptrics*. *Cathetus of obliquation* is a right line drawn perpendicular to a mirror, in the point of incidence, or reflection of a ray. See CATHETUS.

OBLIQUE, in *Geometry*, ſomething aſlant, indirect, or that deviates from the perpendicular.

OBLIQUE *Angle*. See ANGLE.

OBLIQUE-*Angled Triangle*, is that whoſe angles are oblique; *i. e.* either obtuſe, or acute.

OBLIQUE *Arches*. Whenever high roads run oblique to the courſe of any river, rivulet, drain, or canal, neceſſary to be paſſed over by a bridge, the direction of the *former* is generally varied ſo as to be rectangular to the courſe of the *latter*; unleſs in ſmall ſtreams, over which, when their courſe is not made to ſuit the road, there are ſeveral inſtances of the conſtruction of what are uſually termed *ſkew-bridges*. Theſe, with the exceptions which will be afterwards mentioned, have been built in the uſual manner of laying each courſe of ſtones or bricks of the arch parallel to the line of the abutment, and bevelling off their ends, on each exterior face of the arch, in a line correſpondent with the intended direction of the road over the bridge, as ſhewn in *fig.* 1. In this figure it is obvious, that ſo far as one abutment of the bridge extends beyond the rectangular line from the extremity of the other, ſuch a portion of arch, *viz.* *a b*, has no ſupport from the oppoſite abutment, unleſs what may be derived from the interlapping or breaking joint of the bricks or ſtones compoſing the arch; and from the goodneſs of the mortar, tending to cement them into one maſs: therefore, accordingly as theſe circumſtances have operated, and alſo in proportion to the ſmallneſs of the arch, in which the parapet covers a larger ratio of the unſupported part of it, the ſkew-bridges thus built have ſtood more or leſs firm, with an obliquity of 10° to 15° from a rectangle with the abutment; and in many inſtances, that portion of the arch has cracked or given way. Theſe circumſtances have prevented cautious builders from adopting this method; and induced them, in a few inſtances, to build the arch ſquare to its abutments, and run the parapets oblique, to coincide with the line of road; leaving alternate triangles of the arch on the outſide, which has a diſagreeable appearance, and has ſeldom been uſed; therefore, in general, unleſs the courſes of ſtreams or canals were made rectangular to the road, the line of the latter has been altered ſo as to admit of a direct paſſage over the water, which upon high roads, when not curved for a conſiderable diſtance, is inconvenient if not dangerous; and particularly ſo to travellers in the night time; from which cauſe the ſkew-bridges deſcribed were, with all their imperfections, occaſionally had recourſe to; and the writer of this article has never heard of any alteration in their form prior to the year 1787. At this time he had the direction of the county of Kildare canal, a branch from the Grand Canal of Ireland to the town of Naas.

In the courſe of conducting the work, ſeveral of the directors of that canal were anxious to have the line of the roads unvaried; therefore our author was led to conſider whether the uſual imperfect method could not be ſet aſide, by the ſubſtitution of one on ſound principles; and it then occurred that its leading feature muſt be, that the joints of the voiſſoirs, whether of brick or ſtone, ſhould be rectangular with the face of the oblique arch, in place of parallel with its abutment; and, conſequently, the bridges over the county of Kildare canal were made to ſuit the line of road, although the obliquity of one of them was carried to an extent beyond what he deemed eligible in practice, as will appear from the obſervations made on Finlay bridge, near the town of Naas, which deviated 51° from a rectangle with the canal, and conſequently formed the acute angle of 39° with its abutments. Its ſpan, in that oblique direction, was 25 feet, and its pitch 5 feet 6 inches, or nearly $\frac{2}{9}$ths of its ſpan. The plan of this bridge is given in *fig.* 2, and in *fig.* 3. the elevation of its arch, more to ſhew the extent to which it has been carried than to recommend its propriety; principally becauſe of the difficulty of forming the voiſſoirs of the impoſt courſe; and alſo, becauſe to retain the ſame breadth of roadway, the bridge muſt be enlarged as the ſecant of the angle of obliquity is to radius, *viz.* as *a b* to *a c*, which in the preſent inſtance is as 159° to 100°; likewiſe, for general purpoſes, one breaſt-wall on each ſide muſt be conſiderably extended to coincide with its oppoſite one, or nearly ſo; alſo, the impoſt courſe muſt be ſerrated, as ſhewn in the explanation of *fig.* 8; and as the lines, in which the beds of the voiſſoirs run, are obviouſly ſpiral lines, it follows that the ſoffit of each ſtone muſt be curved in that direction, and likewiſe it muſt be twiſted in its ſommering, which, although not inſuperable difficulties, are ſo in ſuch a degree, as, combined with the indented form of the impoſt, to render it adviſable to uſe bricks, both for the impoſt and arch, or at moſt to be contented with the uſe of ſtone only for the quoins and their neceſſary impoſts, in the forming of which intelligent ſtone-cutters will be requiſite, as will appear from *fig.* 3, where a part both of the intrados and extrados of the arch is ſhewn as viewed from an infinite diſtance, not being reduced in perſpective. It is there apparent that the head of each voiſſoir on that ſide of the arch where its face forms an acute angle with its abutment, muſt make an obtuſe angle with its ſoffit, decreaſing in their approach to the crown of the arch, and thenceforward becoming acute, and increaſing as they advance to the other impoſt, where the face of the arch forms an obtuſe angle with its abutment; therefore the different ſides of the ſame voiſſoir muſt form different angles of elevation or depreſſion from the rectangle with its head.

A geometric mode of forming each voiſſoir would be complicated, as will appear from the following diagrams, *viz.* let the lines *a b*, *b d*, and *d c*, in the diagram, *fig.* 4, include a portion of the ſpace to be covered by the arch, *a b* and *c d* being the lines of its abutments: then let the diſtance intercepted between *d b*, and its parallel line *x y*, which likewiſe extends between the abutments, expreſs the extent to be covered by any given number of the voiſſoirs forming that portion of the ſoffit, ſuppoſe every alternate one:—let the circular arcs raiſed upon each of theſe lines expreſs the elevation of the arch at each place reſpectively; *u* and *v* will then ſhew the crowns of their ſoffits. The line *t t*, drawn at right angles with the face of the arch, and with its reſpective extremities equidiſtant from the points *u* and *v*, will repreſent a joint on the ſoffit, which muſt neceſſarily be horizontal at its extremities; becauſe equidiſtant from the crown of each arc, although on alternate ſides; then if equal ſpaces on each ſide of the point, *t*, be ſet off on each reſpective arc, it will ſhew upon each where the joints of the ſame voiſſoirs will coincide. Four of theſe ſpaces in the arc

arc *d u b*, which reprefents the front of the arch, reach from *t* to *d*, *viz.* to the abutment on the fide, where it forms an obtufe angle with that front, whilft the fame number of fimilar fpaces *in the like direction* extend only from *t* to 4, in the arc *x v y*, reprefenting the internal end or extreme extent of the voiffoirs feen on the face of the arch. The fame circumftances are reverfed on the fide where the front forms an acute angle with the abutment, as fhewn by the fimilar references on the other fide of *t t*: confequently the joint 4, in front of the arch, will fall into the impoft at *y* on the rear line. The radiating lines rifing above each arc, drawn from their refpective centres *h* and *g*, fhew the twift or different fommering lines at each extremity of the fame joint: the difference of thefe divergencies would be more clearly feen by exhibiting fimilar lines upon the arc *r v s*, which reprefents that of *x v y*, upon the fame level as the front arc *d u b*, preferving an equal lateral diftance between them, which as it may be eafily conceived is left undone, becaufe they would interfere with the lines requifite for the further explanation of the fubject. The points, *r* and *s*, upon the laft defcribed arc, correfpond with *x* and *y* upon that for which it is fubftituted, every remaining letter or figure of reference being the fame in both.

The vertical fpaces on the acute fide of the arch intercepted between 4 *s*, 3 3, &c. until they become horizontal at *t*, fhew the proportionate depreffion of the foffit of the joints they reprefent; and on the other fide, *d* to 4, on the lower dotted arc; 3 3, &c. fhew the rife on each voiffoir abutting on thefe points. The horizontal bafe between the extremities of each joint is fhewn by the lines *d n*, *z m*, *k k*, &c. which extend between the chords *d b* and *x y*, from the points found by the interfection of the ordinates from the correfpondent numbers of their refpective curves. The horizontal bafe, *k k*, is the only one that is rectangular to the chord of the arc; all the other bafes diverging towards that abutment which forms an obtufe angle with the arch, and increafing towards the haunches. At the firft view of the diagram they appear to diverge both ways, but on inveftigation it will be feen that the letter *n*, on the fide of the acute angle, has reference to the front arc, and on the other fide refers to that reprefenting the inner end of each joint. From thefe data we fhall proceed to fhew the longitudinal fection or fide elevation of a voiffoir at *t t*, and other parts of the arch: *k k*, *fig.* 5, correfpondent with *k k*, *fig.* 4. but on a larger fcale, exprefs the bafe of the voiffoir, and *k r*, its height of face, or its width of bed, which latter may be affumed to be fimilar in the others, *viz.* *d i*, *fig.* 6. and 4 *i* *fig.* 7. The rife of the curve in the foffit between *k* and *k*, muft obvioufly be equal to the difference between the ordinates *t k* and *u e*, *fig.* 4, becaufe the crown of the arch fhewn by the line *v u*, muft be interfected at half-way between *t*, *t*, the extremes of the voiffoir; one end of the ftone being on that fide of the crown defcending to the left, and the other extremity equidiftant on the fide defcending to the right. The breaft-wall is fhewn rifing rectangular from this voiffoir. *Fig.* 6. upon the principles already explained, fhews on the fide where the front line of the arch makes an obtufe angle with its abutment, the voiffoir rifing from the fpringing point at *d* to 4, on the pofterior arc which correfponds with its inner extremity; and *fig.* 7. exhibits, on the fide where the front is acute with its abutment, the bed of a voiffoir commencing at 4, on the front arc *d u b*, and defcending to the abutment at *s*, on the arc reprefenting the other extremity. By thefe diagrams it appears, that under equal widths of bed the fpace between the intrados and extrados increafes upon the face of the arch as the haunches of the arch are approached: therefore the rough blocks for the voiffoirs muft be increafed in their breadth of face to allow for the further divergency of their fommering lines, arifing from their height of face, or difference between intrados and extrados, being increafed as the fecants of their angles of deviation from a rectangle with a line between each extremity of their foffit: *viz.* as *d z* is to *d i*, *fig.* 6, or 4 *r* to 4 *i* in *fig.* 7. And if the twift of the fommering lines be attended to, the long voiffoirs muft have a ftill greater width of block between their beds than the fhort ones: therefore, previoufly to the fitting each ftone to its individual place, as the work advances nothing more can eafily be done than giving due allowance to the firft of thefe variations, which will be fufficient in practice where the arch, excepting its quoins, is formed of brick; becaufe the facility of making the brick fheeting break joint with the ftone voiffoirs of the face, will render it unneceffary to twift the beds of the latter, and with the precaution mentioned, and the neceffary aid of a bevil rule with a moveable joint, and its long arm formed of fhort jointed links to fuit the curve of the foffit, in the direction of each ftone and towards the haunches on each joint of it, the operations of fitting each voiffoir to its place will not be difficult.

Fig. 6. fufficiently fhews the danger of the breaft or face-wall fliding outwards on the acute angles of the foffit; therefore, when the obliquity of the arch is carried near to that of Finlay bridge, which thefe diagrams reprefent, either the breaft-wall fhould be curved, where it forms an obtufe angle with the abutment, or the voiffoir fhould have offsets, which may be of the breadth of a brick, if the wall be built of that material, to form a ftop to its flipping forward, as fhewn by the dotted lines under it in *fig.* 6.

We fhall now point out fome anomalies from the leading principle, which are neceffary to be adverted to, for a due knowledge of the mode of conftructing oblique bridges.

A femicircular arch obvioufly covers a femi-cylinder; and a leffer portion of the arc of a circle will confequently cover a fimilar portion of it. If it be fuppofed, in either inftance, that the cylindric fegment, lying horizontally on its plane, with its axis in the direction of its abutments, is longer than neceffary for the road-way over it, in any given oblique direction; we then, to obtain an oblique arch, have only to conceive the convex face of the cylindric fegment to be cut down between two parallel vertical planes, in the direction required. But this arch, from the nature of cylindric fections, will be elliptic; which is not fo eligible in practice, becaufe of its quicker rife at the haunches of the arch, the inconveniencies of which have already been explained; and they obvioufly militate not only againft the elliptic form, but alfo any near approach to a femicircle.

We have obferved that the leading principle of thefe oblique arches is, that each courfe of voiffoir fhould run rectangular to the face of the arch. This, however, muft be taken in a limited fenfe; becaufe if the fheeting, or bed of the arch, were unfolded, or laid into a plane, its faces on the two extremities, bounding the paffage over it, would not be ftraight lines parallel to each other, like the parapet walls; but would form two curved lines, each convex where the line of the arch is acute with the abutment, and concave when it approaches the other fide where the intercepted angle is obtufe. This irregularity neceffarily arifes from the circumftance, that each front line of the fheeting, *m g p*, and *n h q*, *fig.* 8, in its courfe from the crown of the arch, in a direction oblique to *g h*, (the axis of the vault tranfverfe to the abutments,) muft not, in its fpiral gyration along the furface of the cylindric fegment on each fide of

g h, advance through equal ratios of the axis, in equal portions of the arc, but ſimply as the reſpective horizontal baſes of theſe portions: therefore its deviation from a line rectangular with the axis becomes progreſſively leſs in its approach to each abutment.

The greater or leſs curvature of the two faces of the arch, when drawn out as a plane, muſt depend on the greater or leſs pitch of the arch, as ſhewn in *fig.* 8; where *r s* and *t d* are the abutments of the bridge, and, conſequently, *r s d t* the baſe of the arch. The angle of obliquity is here 51°, as in the preceding diagram: the line *g h* paſſes along the crown of it; and the curved lines, *g m* and *h n*, terminated by the line *m n*, exhibit half the arch of Finlay bridge, drawn out as a horizontal plane; *m n* and *t d* being parallel to, and rectangular from each other; and their diſtances from the crown of the arch, *g h*, in their reſpective lines, *g m*, *h n*, and *g t*, *h d*, being in one the length of the ſemi-arc, and the other that of its baſe. On the other ſide of the line *g h*, the curved lines, *g p* and *h q*, connected by the right line *p q*, ſhew the form of half a ſemicircular arch of the ſame baſe, drawn out into a plane. In both exhibitions, it is clear that lines drawn perpendicular to different parts of the face of the arch, to ſerve as guide-lines to the joints of the ſoffit, would in one part converge to each other, and form triangles; and in the other part, where the face-line extended on a plane is concave, would diverge, ſo as, in both inſtances, to occaſion great irregularity and difficulty in cloſing of the arch; which actually takes place in practice, unleſs due attention be paid to its leading principles, which have been pointed out in the explanation of *fig.* 4, ſo far as that diagram enabled them to be; which, although not to the extent requiſite for the conſtruction of the arch, may be made perfectly comprehenſible to any practical man, by attention to the following inſtructions, *viz.* after the centres, which are placed parallel to the face of the arch, and diagonally to its abutment, are put up, and covered with their plank-ſheeting, carefully ſet off their bounding-lines, *m p* and *q n*, as in any other arch; ſo that every part of theſe face-lines ſhall be perpendicular to, or directly under, a horizontal line ſtretched from *r* to *t*, or from *s* to *d*, upon the level of the crown of the arch. Then, equidiſtant from each abutment, *viz.* along the crown of the arch, ſtrike the line *g h*, which will of courſe be a ſtraight line. Divide it into any given number of equal parts: if very oblique, ten or twelve may be ſufficient; and in arches of ſmall obliquity, a few diviſions will do. The preſent diagram (*fig.* 8.) is more oblique than will probably be adopted; but the ſcale being minute, the line *g h* is divided into only ſix parts, as the purpoſe of explanation will be equally well attained.

The figures 1, 2, 3, &c. in ſucceſſion from *h* to *g*, ſhew the diviſions on that line; and *a*, *b*, *c*, &c. exhibit correſpondent ſpaces cloſe to each abutment. Theſe diviſions being made, ſet out, on the ſheeting, ſo many parallel lines to the outer faces, *m g p*, and *n h g*, *viz.* *a* 1 *a*, *b* 2 *b*, &c.: *k* 1 repreſents a line of joint near the crown of the arch, and rectangular to its face; which commencing at the diſtance of *h k*, will interſect *h g*, the line of the crown, at the diſtance of *h* 1, from the face of the arch; and will repreſent half the line, *t t*, in diagram, *fig.* 4.

By the theory laid down for theſe arches, the joints on their ſoffit are to run parallel to each other; or rather they are to interſect equal portions of parallel equidiſtant arcs, ſtanding in a line oblique to their common axis. This end may obviouſly be obtained, by ſetting off on each face of the arch, and on each of the parallel equidiſtant lines, *a* 1 *a*, *b* 2 *b*, &c. ſpaces ſimilar to *h k*, in ſucceſſion after each other from the points *h* 1, 2, 3, 4, 5, and *g*, towards each abutment; and then to mark upon the ſheeting ſtrong lines, to direct the courſe of the joints, ſuch as ſhewn by *k* 1, 1 *u*, *u v*, &c. which will form a polygonic curve, more or leſs approaching to a regular curve, according to the obliquity of the arch, and its approximation to a ſemicircle, and the number of diviſions between *h* and *g*. The horizontal baſes of the ſoffit joints near the abutments, on each ſide of the arch, are, as ſhewn in *fig.* 4, inclined from the line of the face towards that abutment which forms with it an *obtuſe* internal angle: notwithſtanding which, theſe joints, when drawn on the plane of the ſheeting, deviate from the rectangle, with its face line *towards* the abutment which forms an *acute* internal angle with the line of the arch, and *from* the abutment on the oppoſite ſide, as ſhewn by thoſe lines in *fig.* 8.

Theſe excentricities, although they render it difficult to form all the voiſſoirs prior to the commencement of the arch, are eaſily got over by forming them in ſucceſſion, as deſcribed.

As the lines, *a* 1 *a*, *b* 2 *b*, &c. over the curve of the arch will be rather troubleſome to form correctly, the beſt mode in practice will be to mark off on each face, and each ſide of the arch, a continuation of the ſpaces, *q i* and *h k*, towards each abutment. Then as the progreſſive correſpondent points from *g* and *h*, *viz.* *i f*, *o l*, &c. will have right lines between them, ſtraight chalk-lines can eaſily be ſtruck; and when the ſpaces, *h* 1, *h* 2, &c. are ſet off upon each of them, the interſecting points ſimilar to *u*, *v*, *x*, &c. will be found the ſame as upon the lines *a* 1 *a*, *b* 2 *b*, which, therefore, have no occaſion to be formed.

Had the number of diviſions on the line *h q* been greater, the curvature of the joint lines would have appeared more material on that ſide of the diagram, exhibiting a ſemicircular arch expanded; but on the other ſide, where the arch is of the flat pitch deſcribed, but with great obliquity, the deviation from right lines is ſo much leſs ſo, that in brick-work the joint-lines may eaſily be followed. In ſimilar arcs of moderate obliquity, the divergency is of courſe leſs; but yet it will, unleſs the arch approach within about 20° of a rectangle with its abutments, be ſufficient to occaſion conſiderable irregularity, if the joint-lines be continued acroſs, rectangular from either face.

We had frequent opportunities of ſeeing, for ſeveral years after it was built, the bridge from which moſt of the diagrams have been drawn, and never obſerved any crack in it; but yet from the uncertainty of obtaining careful and intelligent overſeers, and good materials, and likewiſe becauſe of the greater expence, and not having inveſtigated the ſubject in all its bearings, ſo as to lay down ſufficiently plain inſtructions, we did not then, in ſeveral bridges over the Grand Canal of Ireland, which we directed to be built obliquely, and in other bridges, ſubſequently, over wide drains in the Eaſt Riding of Yorkſhire, venture to exceed 40° of obliquity, and rarely 30°, although the angle of interſection of the road and water was generally more conſiderable. It is clearly evident that this extent of angle would often be highly uſeful, as it would rarely leave much to be made up by the deviation of the road from its uſual direction. The wing-walls of Finlay bridge were curved one more than the other on the ſame ſide, to give a paſſage along each bank of the canal; but where not over a canal, if the line of direction of the road coincide with that of the bridge, the wing-walls may terminate more nearly ſquare with the road, or completely ſo, as in *fig.* 9, which ſhews one of theſe bridges under an obliquity of about 40°, with the *arch uncloſed*, ſo as to ſhew the wood ſheeting ſupporting it,

it, and the mode of cloſing it without unequal preſſure on each ſide of the centres.

From what has already been explained, it neceſſarily follows that each impoſt of the arch, in place of being ſimply ſommered to the radiating line of the incumbent curve, muſt alſo, as appears in *fig.* 3, be ſerrated (as ſhewn between *e* and *e*, *fig.* 8.) to ſuit the adjoining bed of the ſtones, or bricks, forming the arch.

The caſual utility of theſe arches is obvious, and the theoretic and practical mode of forming them has been explained to ſuch extent, as to make the proceſs eaſy to any intelligent maſon. Since the period we have mentioned, the plan has in a few inſtances been followed; and the ſame idea may have occurred to others, although we have never heard of it.

The principal uſe of theſe bridges will be where lines of projected canals interſect high roads with obliquity; in which caſe, the road, if curved for a ſufficient extent to fall in with a rectangular paſſage over the canal in ſo gentle a manner as it ought, would require a conſiderable length of double curve, *viz.* alternately outwards and inwards on one ſide, or both, accordingly as the bridge might be placed, an inſtance of the latter of which is ſhewn in ſketch N° 10. Under this predicament, where the land is valuable, or houſes interfere to interrupt the change of road, it may often be found advantageous, becauſe more economical to incur the increaſe of expence attendant on the conſtruction of an oblique bridge; which, under moderate angles of departure from the right line acroſs, is not very material; and where it becomes ſo, will ſometimes be greatly inferior to the advantages acquired by it. We have been indebted for the preceding article to — Chapman, eſq a well-known and ingenious engineer, to whom we have already referred under the article CANAL.

OBLIQUE *Circle*, in the ſtereographical projection of the ſphere, any circle that is oblique to the plane of projection.

OBLIQUE *Leaf*, in *Botany*, is ſo twiſted, that one part becomes vertical, while the other is horizontal. The term *obliquum* is ſometimes, leſs correctly, applied to a leaf unequal at the baſe, or ſides, as in *Begonia* and *Eucalyptus;* in both which it was unfortunately choſen for a ſpecific name, being afterwards neceſſarily changed, when the character proved common to almoſt every ſpecies of thoſe now numerous genera.

OBLIQUE *Line*, a line which, falling on another, makes an oblique angle.

A line falling obliquely on another makes the angle on one ſide obtuſe, and that on the other acute.

OBLIQUE *Percuſſion*, is that wherein the direction of the ſtriking body is not perpendicular to the body ſtruck, or is not in a line with its centre of gravity. See PERCUSSION.

The ratio an oblique ſtroke bears to a perpendicular one, is demonſtrated to be as the ſine of the angle of incidence to the radius.

OBLIQUE *Planes*, in *Dialling*, are ſuch as recline from the zenith, or incline towards the horizon.

The obliquity, or quantity of this inclination, or reclination, is eaſily found by a quadrant; it being an arc of ſome azimuth, or vertical circle, intercepted between the vertex of the place and of that plane. This azimuth, or vertical circle, is always perpendicular to the plane. See DIALLING.

OBLIQUE *Powers* or *Forces*. See MOTION, DIRECTION, &c.

OBLIQUE *Projection*, in *Mechanics*, is that where a body is impelled in a line of direction, which make an oblique angle with the horizontal line. See PROJECTION.

OBLIQUE *Sailing*, in *Navigation*, is when the ſhip, being in ſome intermediate rhumb between the four cardinal points, makes an oblique angle with the meridian, and continually changes both its latitude and longitude.

Oblique ſailing is of three kinds; viz. *plain ſailing*, *Mercator's ſailing*, and *great circle ſailing*. See SAILING.

The ſeamen alſo call the application of the method of calculating the parts of oblique plain triangles, in order to find the diſtance of a ſhip from any cape, head-land, &c. by the name of oblique ſailing.

OBLIQUE *Sphere*, in *Geography*, is that whoſe horizon cuts the equator obliquely; and one of whoſe poles is raiſed above the horizon, by an elevation equal to the latitude of the place.

It is this obliquity that occaſions the inequality of days and nights.

Thoſe who live under an oblique ſphere (as we, and all thoſe in the temperate zone, do) never have their days and equal, except in the equinoxes.

OBLIQUE *Aſcenſion*, in *Aſtronomy*. See ASCENSION.

OBLIQUE *Deſcenſion*. See DESCENSION.

To find the oblique aſcenſion and deſcenſion by the globe, ſee GLOBE.

OBLIQUE *Caſes*, in *Grammar*, are all the caſes of the declenſions of nouns, beſides the nominative. See CASE.

OBLIQUE *Diſtillery*, in *Chemiſtry*. See DISTILLATION.

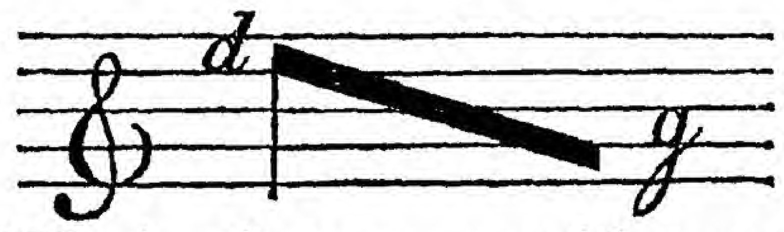
OBLIQUE *Flanks*, in *Fortification*. See FLANK.

OBLIQUITY, that which denotes a thing *oblique*.

The obliquity of the ſphere is the cauſe of the inequality of the ſeaſons of nights and days.

OBLIQUITY *of the Ecliptic*, is the angle which the ecliptic makes with the equator. See ECLIPTIC.

OBLIQUO, in the *Italian Muſic*, ſignifies two breves tied together, which make but one body, whence it is named in Italian *nota d'un corpo ſolo;* ſometimes there is a tail, on the right or left ſide, either aſcending or deſcending. (See NOTE and LIGATURE.) However it be, the two extremes mark the ſound, the middle ſerves only to tie them, thus:



OBLIQUUS, in *Anatomy*, an epithet applied to ſeveral muſcles of the human body.

The *obliqui abdominis* are two large muſcles of the abdomen. As the muſcles of this part are much connected together, and cannot be well underſtood, when deſcribed in an inſulated way, we ſhall give an account of the whole in this article.

The ſides or parietes of the abdominal cavity are compoſed almoſt entirely of muſcles: the diaphragm ſeparates it above from the cheſt, (ſee DIAPHRAGM.) and the levator ani ſhuts it up below (ſee INTESTINE). At the front and ſides its boundaries are formed by the *abdominal* muſcles properly ſo called, which fill up all the ſpace between the inferior aperture of the cheſt and the ſuperior margin of the pelvis. The contractions of theſe muſcles change the dimenſions and form of the abdomen, move the viſcera in different directions, and execute many of the movements of the trunk. The details concerning theſe points will be found in the preſent article, in thoſe juſt referred to, and in the article LUNGS.

The abdominal muſcles are five on each ſide of the body: three of theſe are very broad, and placed in ſucceſſion, one within the other, at the ſide of the abdomen. They end in front, in broad and thin aponeuroſes or ſheets of tendon, which occupy all the front of the trunk between the cheſt and pelvis. The formation of theſe muſcles is therefore peculiar, and the peculiarity ariſes from their being placed on the

OBLIQUE ARCH.

Fig. 1.

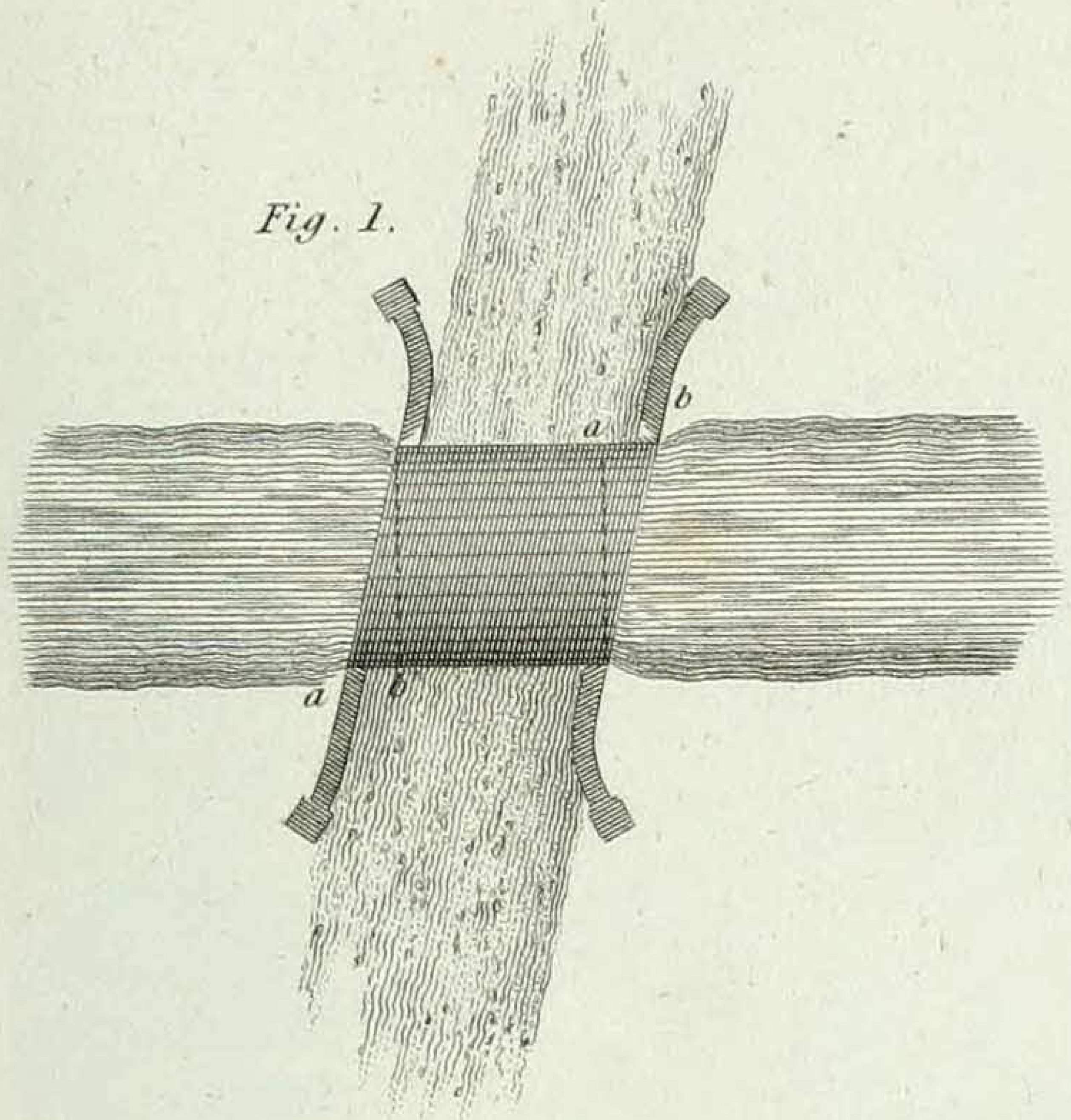


Fig. 2.

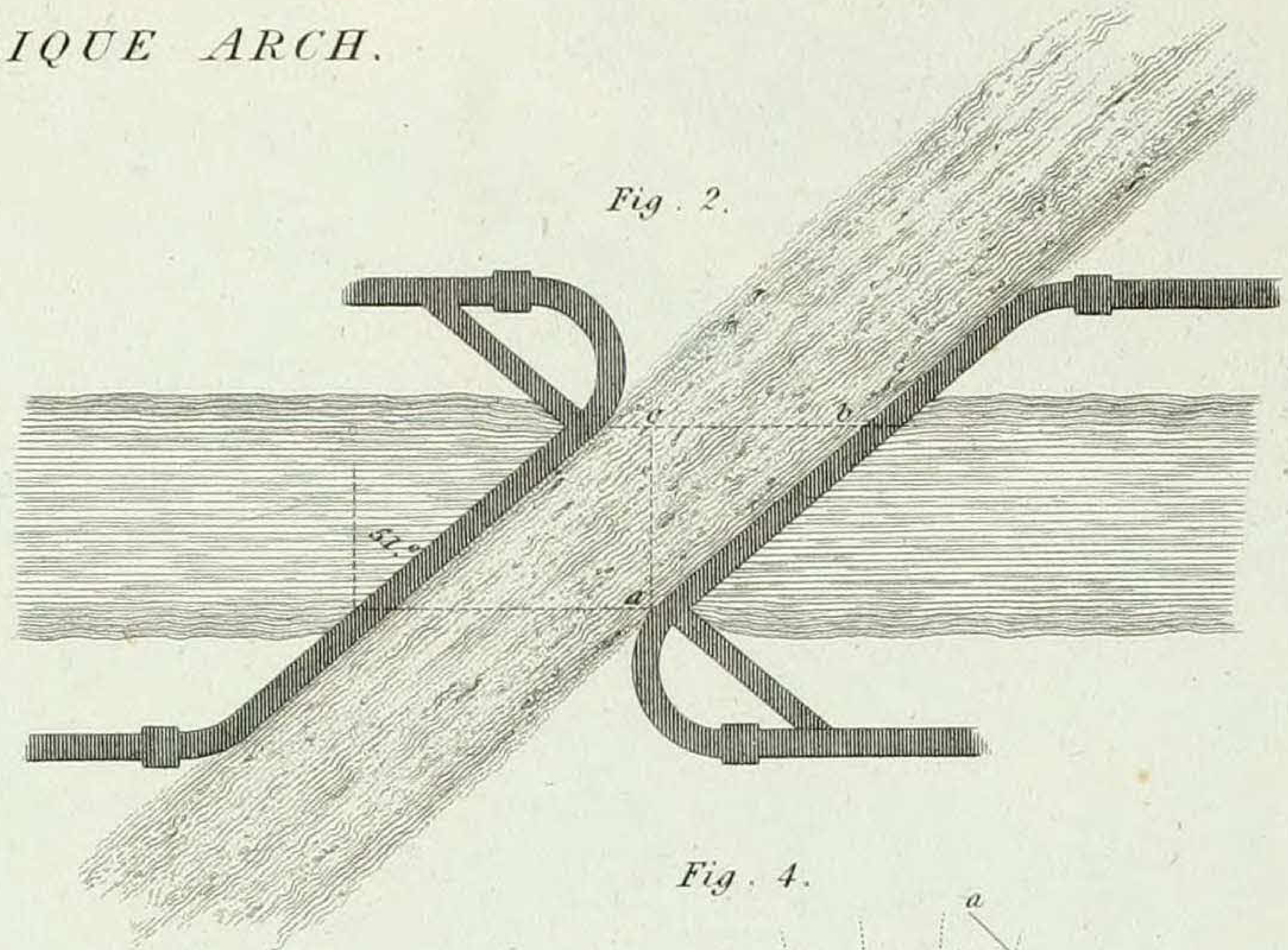


Fig. 3.

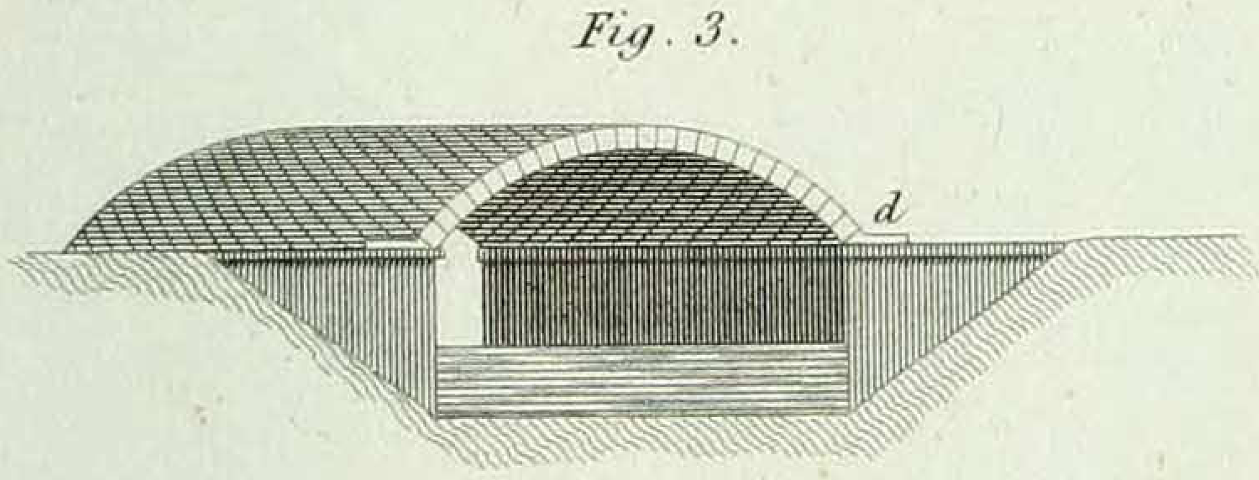


Fig. 4.

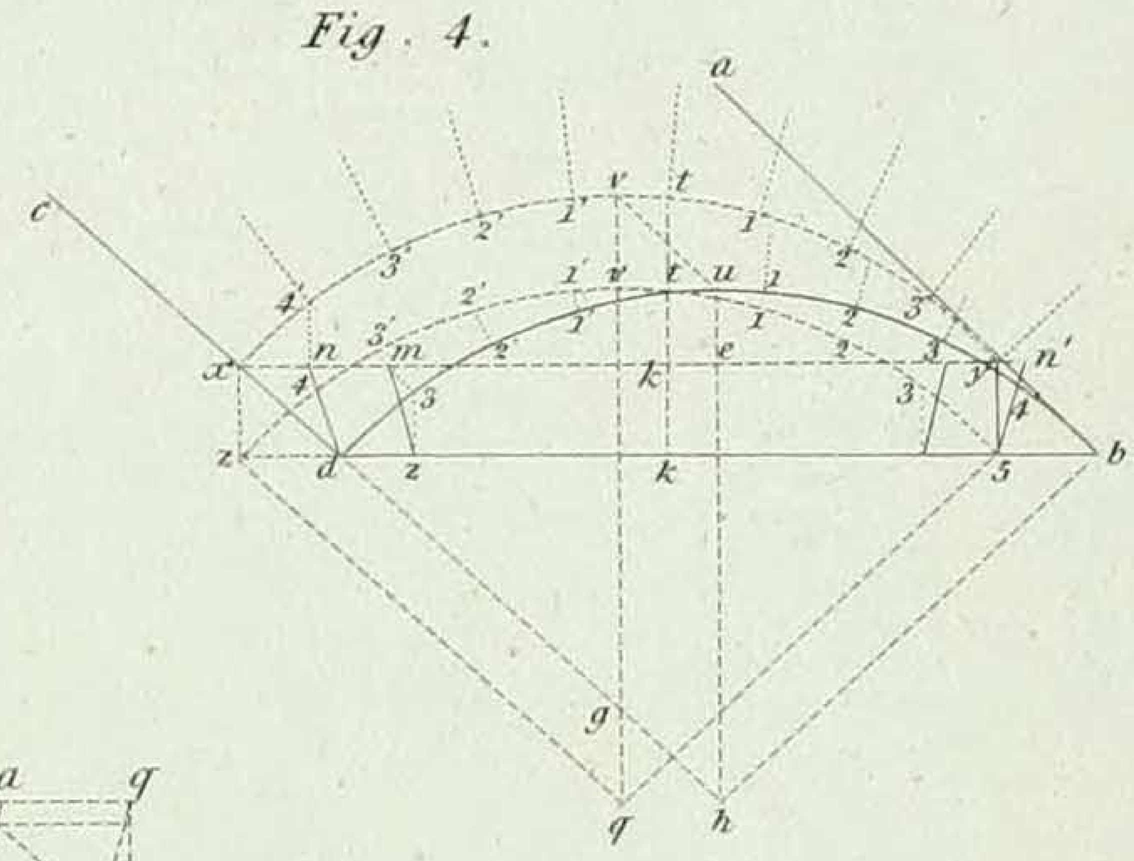


Fig. 5.

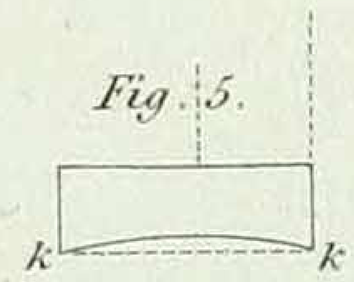


Fig. 8.

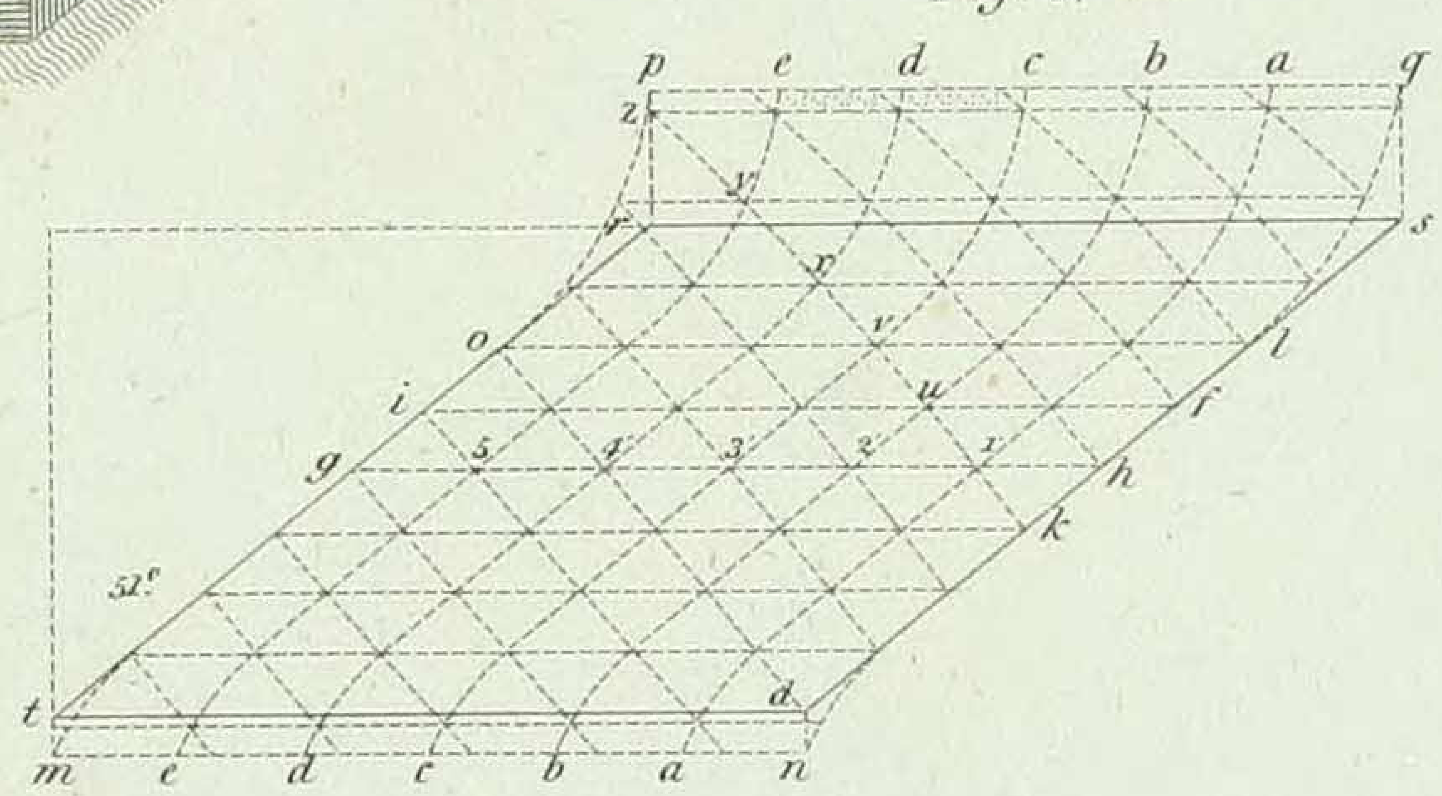


Fig. 7.

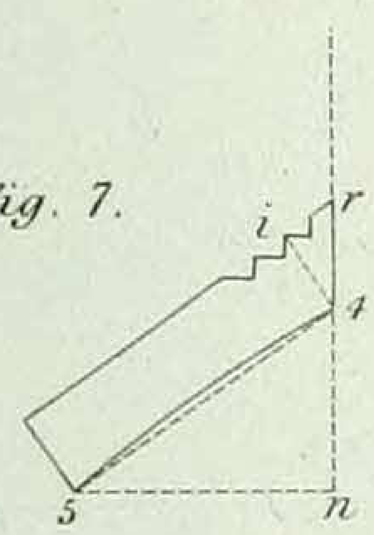


Fig. 6.

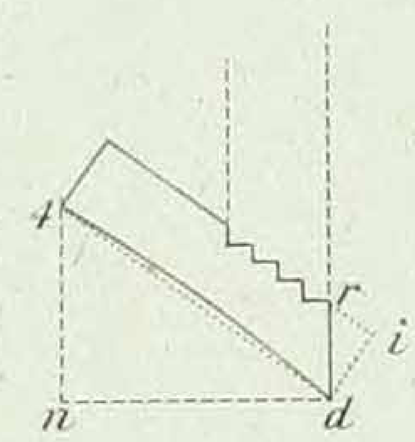


Fig. 9.

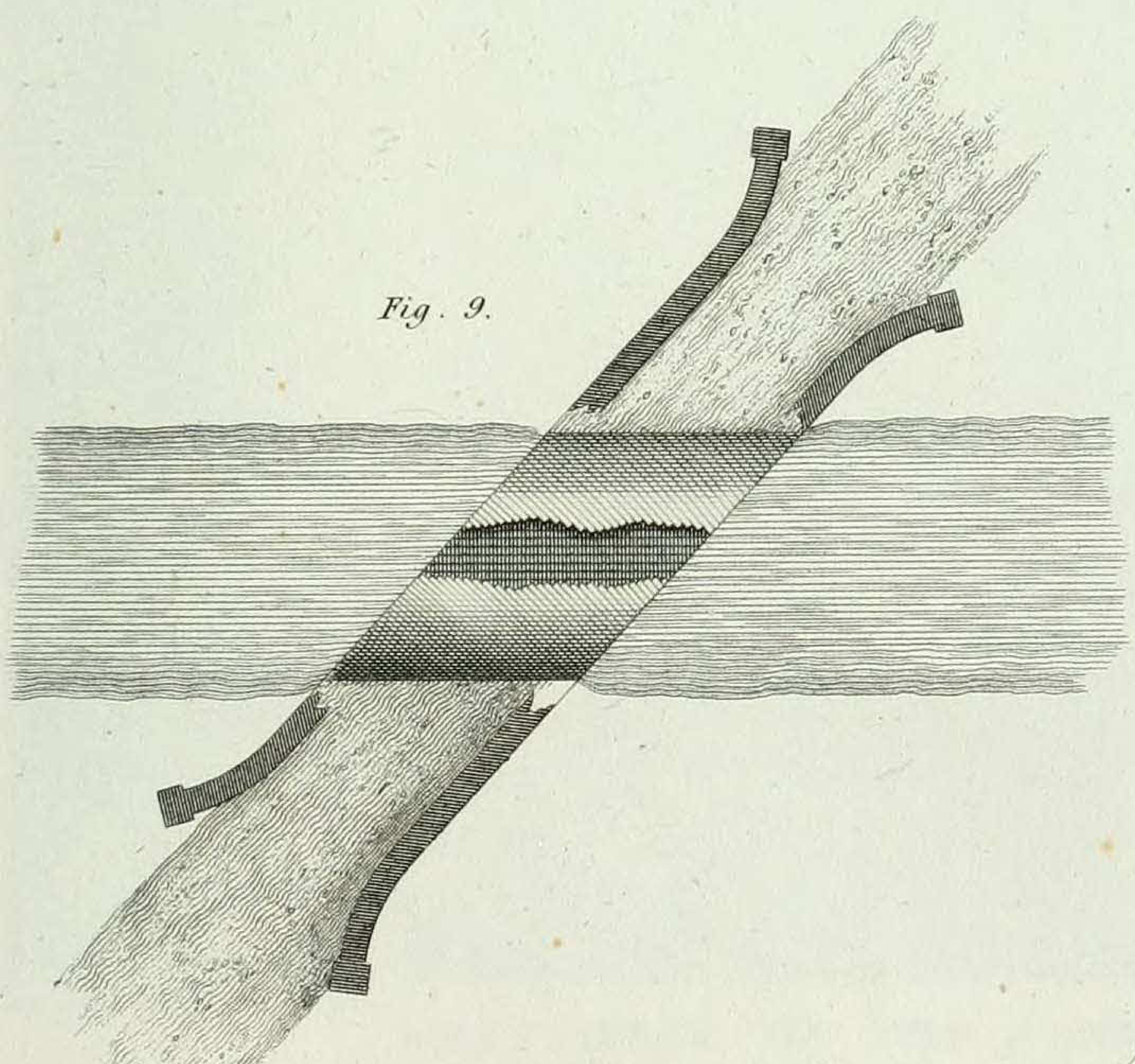
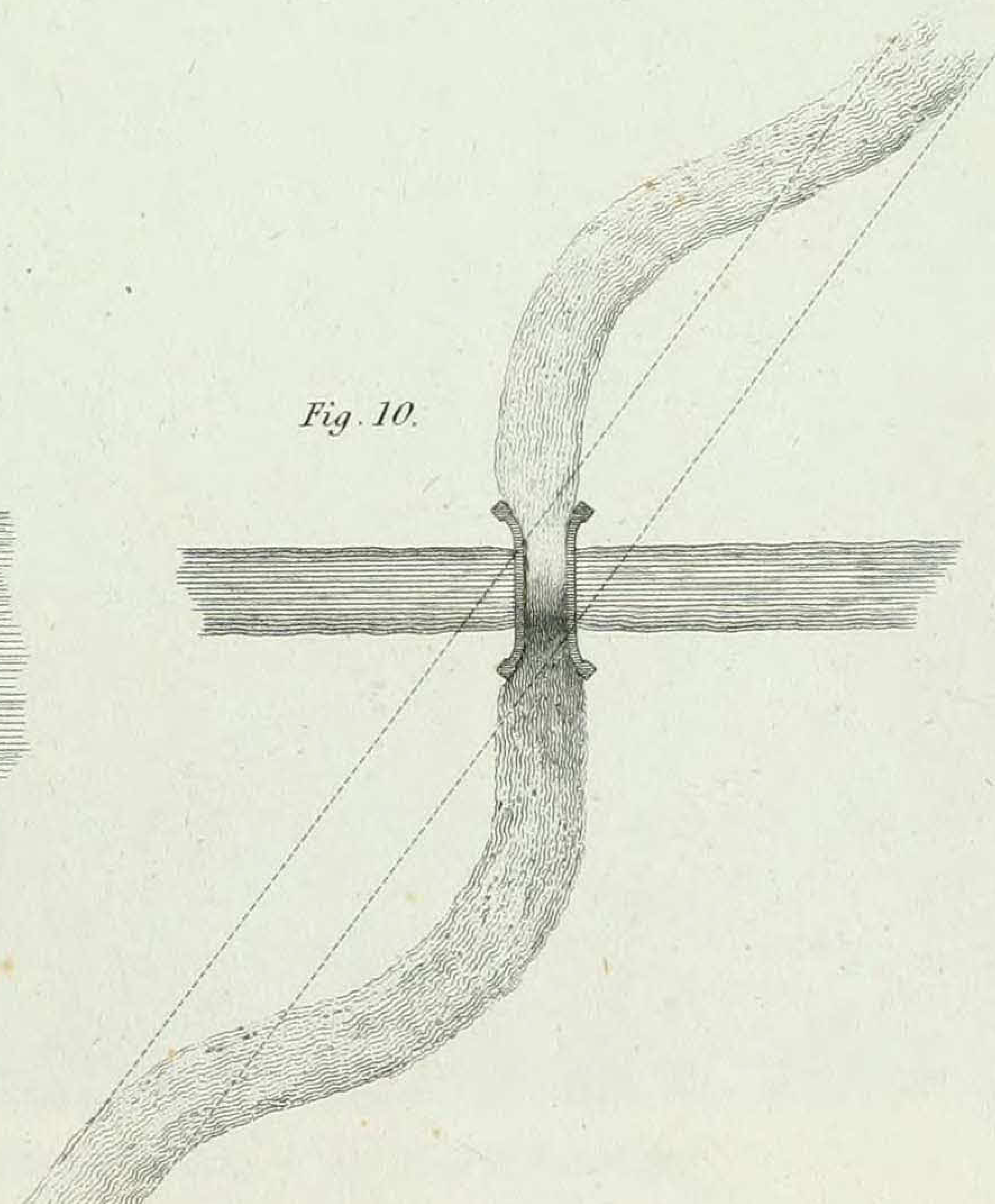


Fig. 10.



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